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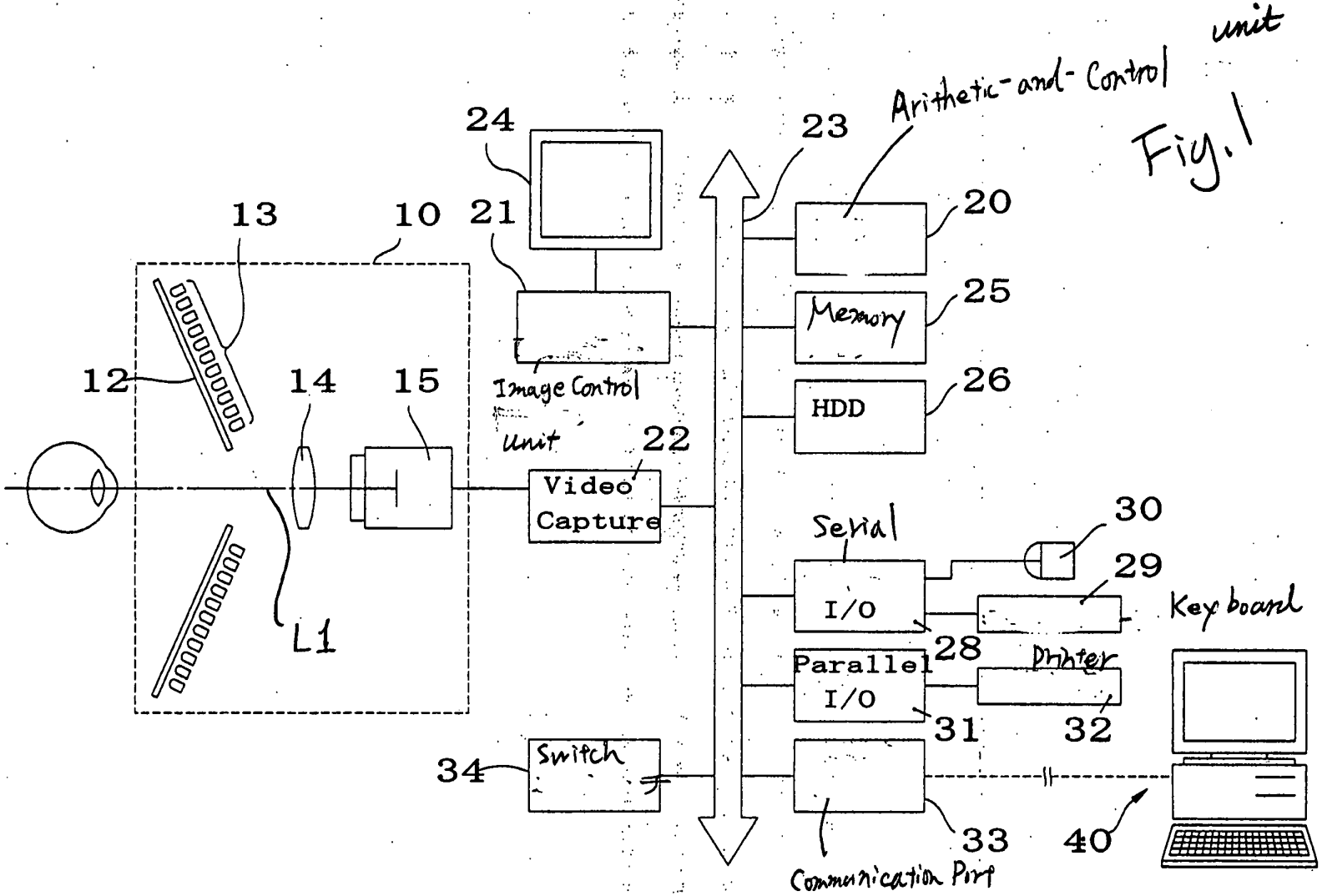

Arithetic-and-Control unit
24
23
13
10
21
20
Memory
25
12
14
15
Image Control unit
HDD
26
22
Video Capture
Serial
30
29
I/O
Key board
28
Parallel I/O
Printer
31
32
34
Switch
33
40
Communication Port
L1

Fig. 1

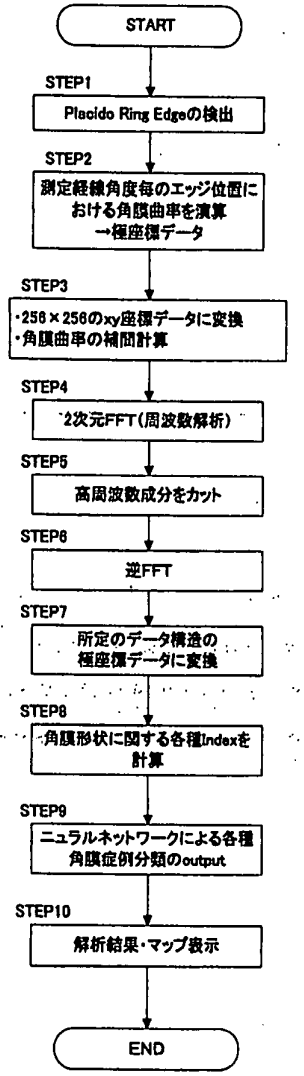


Fig. 2

FIG. 2

STEP 1:

DETECT EDGES OF PLACIDO RINGS

STEP 2:

CALCULATE CORNEAL CURVATURE AT EDGE POSITION AT EACH ANGLE OF MEDIANS. CONVERT CURVATURES INTO POLAR COORDINATE DATA.

STEP 3:

CONVERT DATA INTO 256 × 256 xy-COORDINATE DATA

CALCULATE CORNEAL CURVATURES BY INTERPOLATION

STEP 4:

2D FFT (FREQUENCY ANALYSIS)

STEP 5:

CUT OUT HIGH-FREQUENCY COMPONENTS

STEP 6:

INVERSE FFT

STEP 7:

CONVERT DATA INTO POLAR COORDINATE DATA OF GIVEN DATA STRUCTURE

STEP 8:

CALCULATE INDEXES ABOUT CORNEAL TOPOGRAPHY

STEP 9:

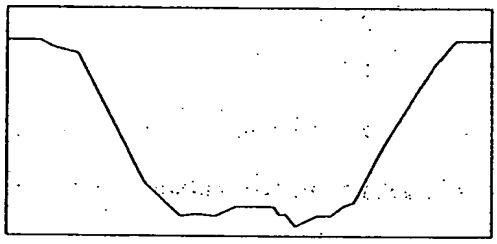
OUTPUTTING OF CASSIFICATIONS OF CORNEAL TOPOGRAPHIES USING NEURAL NETWORK

STEP 10:

DISPLAY RESULTS OF ANALYSIS AND MAPS

Fig. 3

(a)



(b)

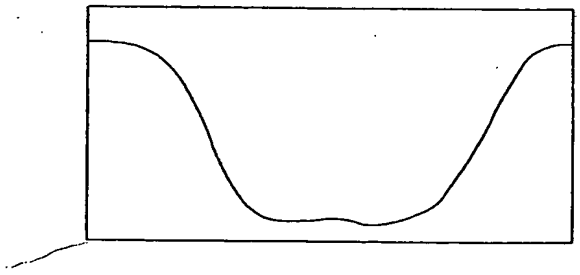
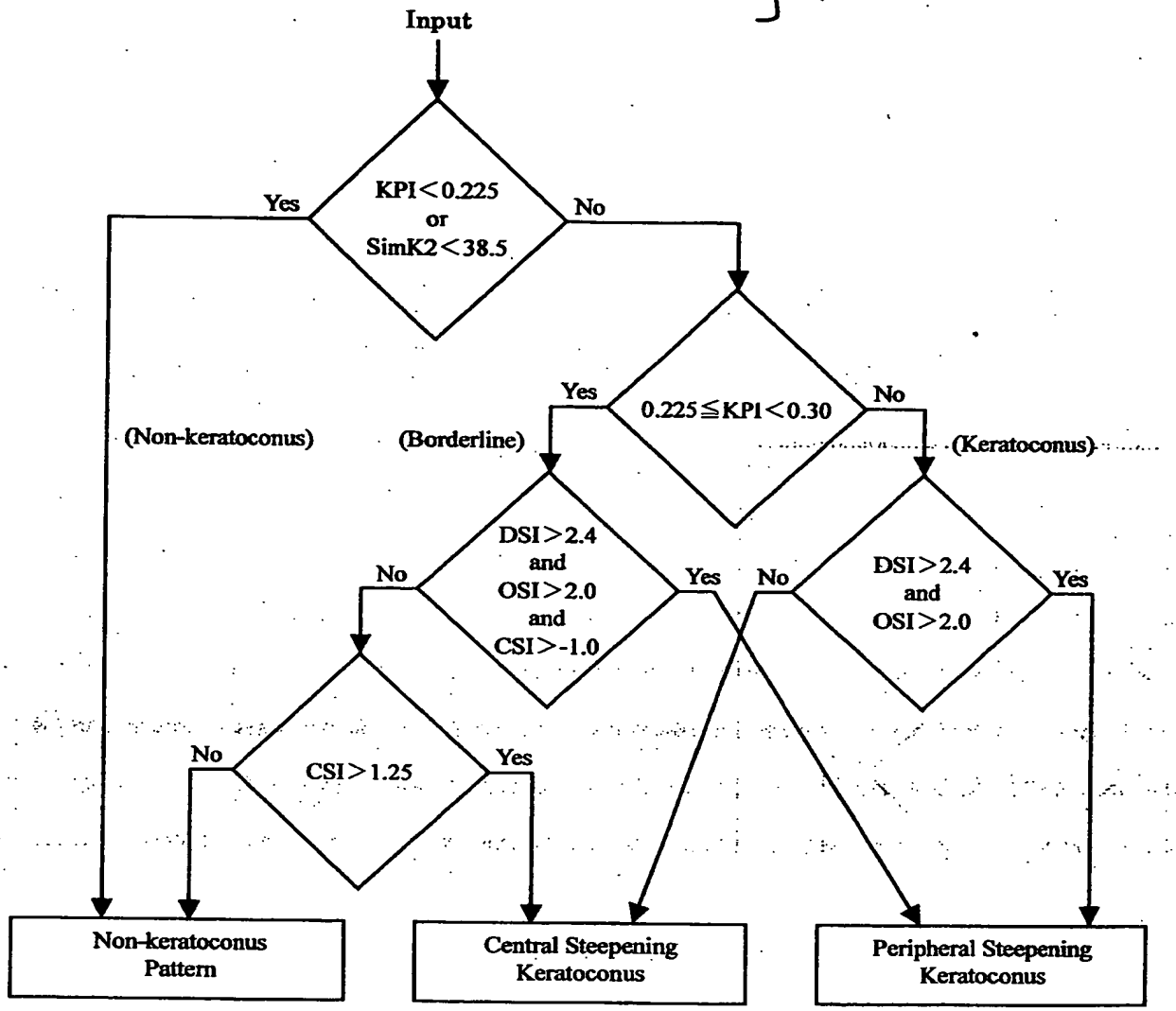


Fig. 9

Binary Decision Tree in Expert System



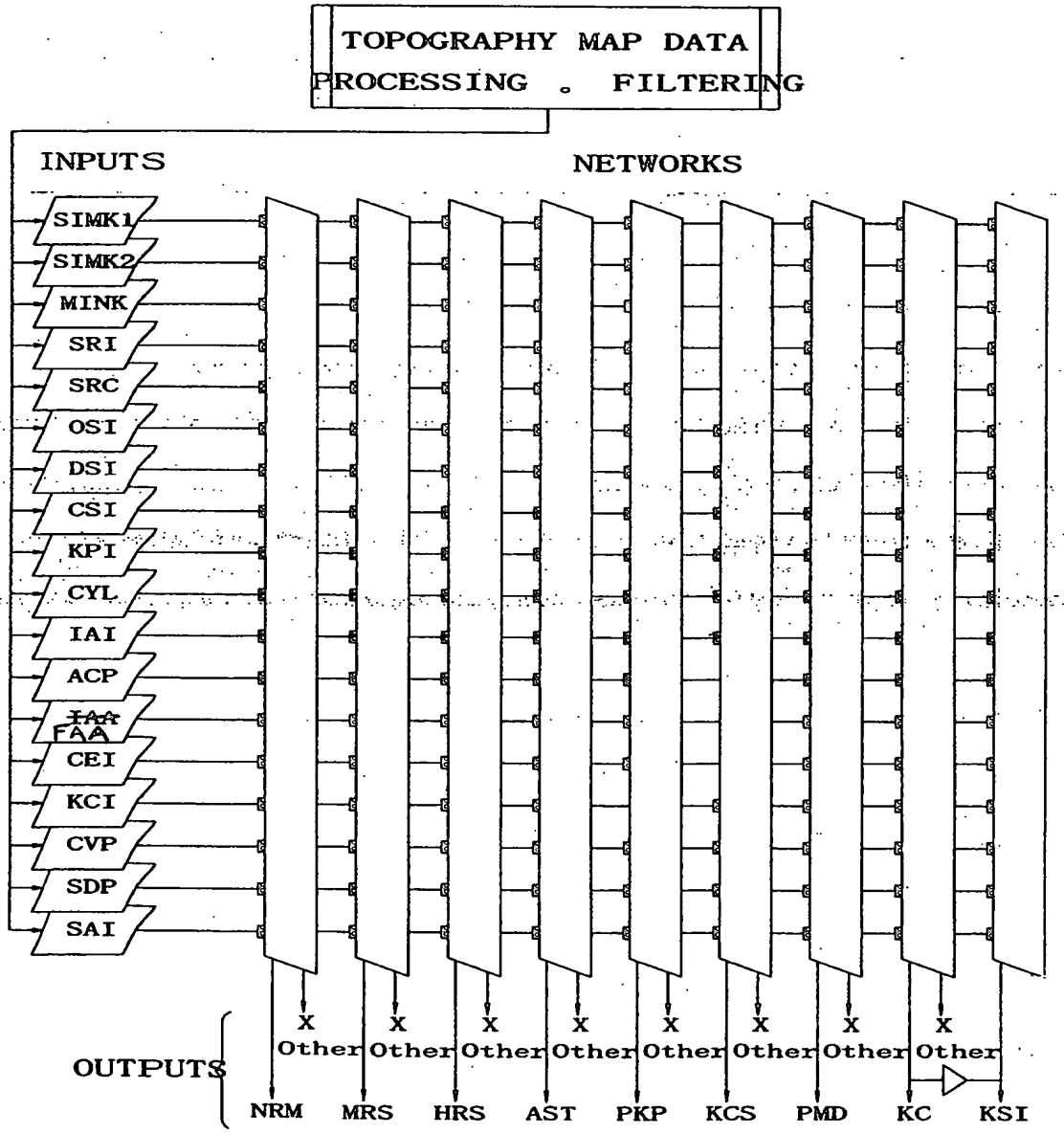
$$A = \frac{KPI \times 500.0 - 100.0}{100.0}$$

$$KCI = 0.0$$

$$KCI = \begin{cases} 0.0 (-A > 0.0) \\ -A (-1.0 \leqq -A \leqq 0.0) \\ -1.0 (-A < -1.0) \end{cases}$$

$$KCI = \begin{cases} 0.0 (A < 0.0) \\ A (0 \leqq A \leqq 1.0) \\ 1.0 (A > 1.0) \end{cases}$$

Fig. 5


TOPOGRAPHY MAP DATA
PROCESSING . FILTERING
INPUTS
NETWORKS
SIMK1
SIMK2
MINK
SRI
SRC
OSI
DSI
CSI
KPI
CYL
IAI
ACP
FAA
CEI
KCI
CVP
SDP
SAI
X
Other
OUTPUTS
NRM
MRS
HRS
AST
PKP
KCS
PMD
KC
KSI

Graph

	0% 25% 50% 75% 100%
NRM	0.0%
AST	0.0%
KCS	0.0%
KC	99.4% KSI=93.04%
PMD	0.0%
PKP	0.1%
MRS	0.2%
HRS	0.0%
OTH	0.3%

Statistics

SRI	:	1.94	ACP	:	54.86
SIMK1	:	61.86	IAI	:	0.71
SIMK2	:	54.07	FAA	:	74.96
MINK	:	52.03	KCI	:	1.00
OSI	:	13.46	CVP	:	194.78
DSI	:	22.12	SDP	:	9.88
CSI	:	5.93	SAI	:	3.62
KPI	:	0.54	CEI	:	1.32
CYL	:	6.32	SRC	:	1.84

FIG. 6

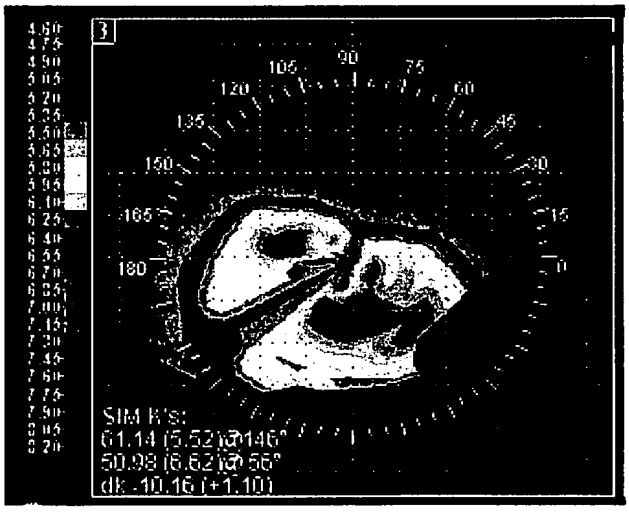


FIG. 7

Fig. 8

KSI = 0.0069 (SIMK1) + 0.0016 (OSI) + 0.0220 (SRI) + 0.0055 (DSI) + 0.0091 (MINK) + -0.0225 (KPI) + 0.0087 (CYL) + 0.0144 (IAI) + -0.0009 (CSI) + -0.0137 (SAI) + 0.0489 (SDP) + 0.0073 (ACP) + -0.0032 (CEI) + 0.0224 (SRC) + 0.0243 (SIMK2) + 0.0257 (CVP) + -0.0737 (FAA) + 0.0071 (KCI)

KCS = -0.2536 (OSI) + 0.6255 (DSI) + 0.6087 (KPI) + 0.0262 (CYL) + 0.1073 (IAI) + 0.5513 (CSI) + 0.4107 (SAI) + -0.2324 (SDP) + -0.1727 (CEI) + -0.5790 (CVP) + 0.0054 (KCI)

PMD = 0.1244 (SIMK1) + 0.1081 (OSI) + 0.0785 (SRI) + 0.0725 (DSI) + 0.0452 (MINK) + 0.0393 (KPI) + 0.0386 (CYL) + 0.0167 (IAI) + 0.0003 (CSI) + -0.0035 (SAI) + -0.0153 (SDP) + -0.0221 (ACP) + -0.0321 (CEI) + -0.0681 (SRC) + -0.0762 (SIMK2) + -0.1198 (CVP)

PKP = 0.0866 (SIMK1) + 0.0302 (OSI) + -0.0006 (SRI) + 0.0028 (DSI) + -0.0314 (MINK) + 0.0583 (KPI) + 0.0021 (CYL) + 0.1338 (IAI) + -0.0459 (CSI) + -0.0156 (SAI) + -0.0294 (SDP) + -0.0155 (ACP) + 0.0183 (CEI) + -0.0121 (SRC) + 0.0029 (SIMK2) + -0.0451 (CVP) + -0.0033 (FAA)

NRM = -0.1650 (SIMK1) + -0.0141 (OSI) + -0.0519 (SRI) + -0.2721 (DSI) + 0.0299 (MINK) + 0.2572 (KPI) + -0.3062 (CYL) + 0.0255 (IAI) + 0.1941 (CSI) + -0.2009 (SAI) + -0.3098 (SDP) + -0.1189 (ACP) + 0.1186 (CEI) + -0.0528 (SRC) + -0.0622 (SIMK2) + -0.3062 (CVP) + -0.0764 (FAA) + -0.1250 (KCI)

MRS = -0.0359 (SIMK1) + 0.0333 (OSI) + -0.0037 (SRI) + -0.0078 (DSI) + 0.0048 (MINK) + 0.3986 (KPI) + -0.0508 (CYL) + 0.0273 (IAI) + -0.0286 (CSI) + 0.0046 (SAI) + 0.0369 (SDP) + -0.0037 (ACP) + -0.0706 (CEI) + 0.0567 (SRC) + 0.0039 (SIMK2) + -0.0060 (CVP) + 0.0351 (FAA) + -0.0227 (KCI)

KC = 0.1655 (SIMK1) + 0.0585 (OSI) + -0.1228 (SRI) + 0.0637 (DSI) + 0.0210 (MINK) + 0.1189 (KPI) + 0.0416 (CYL) + -0.1346 (IAI) + 0.1096 (CSI) + 0.0809 (SAI) + 0.0325 (SDP) + 0.0667 (ACP) + -0.0499 (CEI) + -0.0257 (SRC) + -0.0853 (SIMK2) + 0.0298 (CVP) + -0.0237 (FAA) + 0.0096 (KCI)

HRS = -0.1336 (SIMK1) + -0.1360 (OSI) + -0.1332 (SRI) + 0.2551 (DSI) + 0.2585 (MINK) + -0.1508 (KPI) + -0.4129 (CYL) + 0.1856 (IAI) + -0.2606 (CSI) + -0.2394 (SAI) + -0.0501 (SDP) + -0.1463 (ACP) + 0.2777 (CEI) + 0.2931 (SRC) + 0.1321 (SIMK2) + -0.0815 (CVP) + 0.1675 (FAA) + -0.1375 (KCI)

AST = 0.0051 (SIMK1) + -0.0042 (OSI) + -0.0012 (SRI) + 0.0022 (DSI) + 0.0034 (MINK) + -0.0057 (KPI) + 0.0031 (CYL) + -0.0029 (IAI) + 0.0013 (CSI) + -0.0041 (SAI) + -0.0054 (SDP) + 0.0022 (ACP) + 0.0039 (CEI) + -0.0050 (SRC) + 0.0028 (SIMK2) + -0.0054 (CVP) + 0.0021 (FAA) + -0.0012 (KCI)